U.S. ARMY TECHNICAL CENTER FOR EXPLOSIVES SAFETY

EXPLOSIVES SAFETY

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LIGHTNING PROTECTION

The subject of lightning protection for Army explosives facilities has received renewed interest in the recent past. There has been a great deal of discussion on why we need lightning protection and on how we design, inspect, and test our lightning protection systems (LPSs). We are constantly reminded of Department of Defense (DOD), DA, and major Army command (MACOM) emphasis on this subject when we are visited by inspection teams from the Department of Defense Explosives Safety Board (DDESB), Defense Nuclear Agency (DNA), and Inspector General (IG).

We place an LPS on our explosives facilities to control where lightning attempts to strike a facility. The LPS is designed to direct the lightning stroke away from the facility. The complete LPS is designed to protect our explosives facilities from both the direct and indirect effects of lightning strikes. Therefore, we not only need an air terminal system but we must also include protection against the indirect effects of lightning to include surge suppression.

This special edition of the Explosives Safety Bulletin provides new guidance and POCs to help you maintain and improve the LPSs at your facilities. The U.S. Army Technical Center for Explosives Safety (USATCES) will provide technical assistance to help you design, maintain, inspect, and test your LPSs.

NEW DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD (DDESB) POLICY ON LIGHTNING PROTECTION FOR EXPLOSIVES FACILITIES

The DDESB, at their 306th meeting, voted several changes into their policy on lightning protection for explosives facilities. The significant changes include:

1. Equivalent lightning protection systems (LPSs) to those listed in the current chapter on lightning protection are permitted if they provide equivalent protection as approved by DDESB.

2. No lightning protection is required for explosives facilities when the following conditions are met:

(a) A lightning warning system is available to permit termination of operations and withdrawal of all personnel to inhabited building distance (IBD) prior to the incidence of an electrical storm.

(b) The explosives facility contains only ammunition and/or explosives that cannot be initiated by lightning and no fire hazard exists.

(c) Personnel are not expected to sustain injury and any resulting economic loss to the structure, its contents, or surrounding facilities is minimal.

3. Salt water grounds are permitted.

4. The maximum resistance to earth value was raised from 10 ohms to 25 ohms.

5. The grounding system is to be electrically tested during the same season for each test cycle.

6. The Services were given the authority to establish the electrical test intervals.

7. Wires and connectors on an LPS may be painted.

8. Ground loop (counterpoise) earth electrodes must be electrically tested.

9. All records of inspection and test of LPSs must be retained for at least six cycles.

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INTERIM DA POLICY ON LIGHTNING PROTECTION

In recent years, the Army has focused on improving the way it provides adequate lightning protection for its ammunition and explosives facilities. Currently, there is a new DAP 385-64, Ammunition and Explosives Safety Standards, being staffed through HQDA. chapter 6 of DAP 385-64 deals specifically with electrical safety, including lightning protection. Pending final staffing and distribution of the pamphlet, the Office of the Chief of Staff, U.S. Army (OCSA) has forwarded chapter 6 of the draft to Army organizations. It provides definitive requirements on the design, inspection, and test for lightning protection systems (LPSs) in use by the U.S. Army (USA). The new chapter also implements recent changes to the DOD 6055.9-STD, July 1984, DOD Ammunition and Explosives Safety Standards, in the following areas:

1. Raises the allowable resistance-to-earth from 10 ohms to 25 ohms.

2. Permits LPSs to be used that are equivalent in protection to the ones currently approved.

3. Increases the electrical test interval from 14 months to 24 months.

Organizations with responsibility for assuring safe storage of their munitions are encouraged to become familiar with the new chapter 6.

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REQUEST FOR INFORMATION ON DOCUMENTED LIGHTNING STRIKES

We are looking for better ways to collect data concerning lightning protection for munitions facilities in order to get the information out to our operators. In support of this effort, the U.S. Army Technical Center for Explosives Safety (USATCES) is establishing a central information pool on documented or suspected lightning strikes at our installations. We need your help to make this work. We ask each of you to take a minute and review your files and desk drawers for any data that we could use. If you have reports, photographs, newspaper clippings, slides, etc. which relate to these types of incidents, contact one of the article's authors.

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OPERATOR HANDBOOKS

The U.S. Army Technical Center for Explosives Safety (USATCES) is developing two separate publications aimed at assisting operators in the design, test, and inspection of lightning protection systems (LPSs). The first is an LPS and Grounding Inspection and Test Handbook. The other is an LPS and Ground System Design Guide. These documents are still in the preliminary stages of development. Organizations which store and manufacture ammunition and explosives may be asked for input and/or review assistance.

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ELECTRICAL SAFETY TRAINING FOR ARMY EXPLOSIVES FACILITIES

The U.S. Army Defense Ammunition Center and School (USADACS) has been tasked by the Office of the Chief of Staff, U.S. Army (OCSA) Safety Office, DACS-SF, to develop and establish an Electrical Safety Training Course for Army Explosives Facilities to be presented at USADACS. The course will provide the Army with trained personnel who understand the potential electrical hazards in and around explosives facilities and are capable of design review, maintenance, inspection, and testing of lightning protection systems (LPSs) and grounding systems.

Course content will include the identification of LPS components, design criteria, and requirements. Included are the requirements for grounding, bonding, control of static electricity, and electrical equipment in locactions classified as hazardous. An overview of the Hazards of Electromagnetic Radiation to Ordnance (HERO), Fuel, and Personnel will be presented. One day will be allocated to a field exercise involving visual inspections and electrical test procedures of LPSs. Students must be able to demonstrate proficiency through proper utilization of test equipment and passing a written examination.

Course attendees should include engineers, safety professionals, technicians, Quality Assurance Specialist (Ammunition Surveillance) (QASAS) personnel, Ammunition Managers, or facility engineering in civilian grades GS 05-15, WG 06-09, WL 01-09, WS 01-11, or military rank equivalent to civilian grade level. Attendees should be directly involved in, or supervise personnel involved in the design review, installation, testing, or inspection of electrical services, equipment, and lightning and grounding systems in explosives facilities.

The course is presently being developed by the USATCES and the Conventional Ammunition and Explosives Safety Division, USADACS. The first class is scheduled to be presented 22-25 September 1992.

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LIGHTNING PROTECTION SYSTEM (LPS) TRAINING/LABORATORY FACILITY

An LPS training/laboratory facility is being established at U.S. Army Defense Ammunition Center and School (USADACS) for use by students attending the Electrical Safety Training Course for Army Explosives Facilities and the staff of the U.S. Army Technical Center for Explosives Safety (USATCES). The facility is currently being designed by Savanna Army Depot Activity (SVADA) facility engineers. Construction is scheduled to begin in 4th Quarter, FY 92.

Plans include the installation of both ground rod and ground loop earth electrode systems. Two 60-foot masts with air terminals and overhead wire will make up the overhead ground wire (catenary) air terminal system. Down conductors will connect the air terminal systems to the earth electrode system which will include inspection wells.

Once completed, the LPS training facility will be used by students for conducting visual inspections and electrical test procedures of LPSs. The USATCES staff will also conduct experiments/tests of equipment and test meters at this facility.

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The EXPLOSIVES SAFETY BULLETIN targets the ammunition/explosives community. It is printed in Savanna, Illinois.

If you wish to submit an article that is of interest to the ammunition/explosives community, or if you have a request for more copies of the bulletin, please forward it to: Director, U.S. Army Technical Center for Explosives Safety, Attn: SMCAC-ESM, Savanna, Il 61074-9639 or call us at DSN 585-8745, commercial (815) 273-8745

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